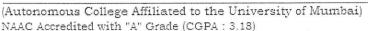


### Shri Vile Parle Kelavani Mandal's

#### DWARKADAS J. SANGHVI COLLEGE OF ENGINEERING





Academic Year (2022-23) Year: 3 Semester: V

Program: B.Tech Mechanical Engineering

Subject: Introduction to Robotics (DJ19MN5C1)

Date: 03/01/2022 Duration: 3 Hours Max. Marks: 75

Time: 10:30 am to 1:30 pm

### **REGULAR EXAMINATION**

Instructions: Candidates should read carefully the instructions printed on the question paper and on the cover page of the Answer Book, which is provided for their use.

- (1) This question paper contains two pages.
- (2) All Questions are Compulsory.
- (3) All questions carry equal marks.
- (4) Answer to each new question is to be started on a fresh page.
- (5) Figures in the brackets on the right indicate full marks.
- (6) Assume suitable data wherever required, but justify it.
- (7) Draw the neat labelled diagrams, wherever necessary.
- (8) Each question is set from one module, Q1, 2, 3, 4 is related to module/unit 1, 2, 3 & 4.
- (9) Q5 is related to module/unit 5 & 6.

Question No.	Particulars of the question	Max. Marks
Q1 (a)	What is programmable automation, explain with neat sketches.	5
(b)	Write the three Issac Asimov's laws of robotics.	4
(c)	Brief out the classification of robots based on motion control.	6
	OR	
(a)	Explain what is tool orientation, explain Yaw, Pitch & Roll.	7
(b)	Write a note on the generations of robots similar to generations of computers.	4
(c)	Explain the different between a link & a joint of a robot arm with a neat drawing.	4
Q2 (a)	Explain the correlation between human anatomy & robotic anatomy	5
(b)	What do you mean by hybrid drives, explain	5
(c)	Interpret what are hydraulic actuators and for what purpose they are use for.	5
	OR	
(a)	What are the pneumatic drive applications in robotics?	5
(b)	Explain power transmission devices that could be used in robotics?	5
(c)	Explain the types of electrical motors / actuators used in robots.	5



## Shri Vile Parle Kelavani Mandal's

# DWARKADAS J. SANGHVI COLLEGE OF ENGINEERING



(Autonomous College Affiliated to the University of Mumbai) NAAC Accredited with "A" Grade (CGPA: 3.18)

Q3 (a)	What are force sensors, explain them.	6
(b)	Explain tactile sensors in brief with a neat sketch or a diagram.	4
(c)	Write a note on position & velocity sensors	5
	OR	
(a)	Explain the proximity sensors & its application with a neat diagram	5
(b)	What are potentiometric (pots) sensors, write its block-diagram & its applications.	5
(c)	In detail, explain the infra-red sensors with diagrams.	5
Q4 (a)	AMS-Define Articulated Mechanical System with a neat sketch, explain the parts.	6
(b)	What are tools & grippers that are used as end-effectors in robotic manipulators.	5
(c)	Write a note on pneumatic grippers for picking up glass/paper/delicate objects.	4
8	OR	
(a)	What is need for a robot wrist similar to human wrist, for what purpose it is used?	4
(b)	Explain the types of gripper actuations that are used for actuating the grippers.	5
(c)	Write a note on the materials used for designing a particular robot.	6
Q5(a)	Explain what a robot brain or robot controller is, define it.	5
(b)	List out the different types of robotic programming languages that could be used for programming of robots.	5
(c)	What is on-line programming & off-line programming of robots.	5
	OR	
(a)	Explain the space applications of robots that could be used for various applications.	6
(b)	Explain the social, environmental & economic issues in robotic applications.	5
(c)	What are the applications of nanorobots & microbots in medicine?	4